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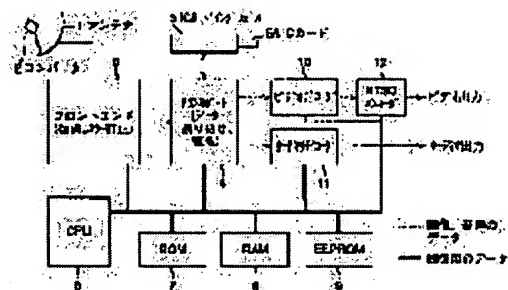
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(54) DATA RECEPTION PROCESSOR, DATA RECEPTION PROCESSING METHOD AND BROADCASTING METHOD

(57)Abstract:

PURPOSE: To add an extension function program at low cost.

CONSTITUTION: The basic program stored in the ROM 7 of a decoder for digital television broadcast is preliminarily provided with the branching step to an extension function program. In this branching step, when the entries t1 to t3 of an EEPROM 9 are referred and a prescribed address is described in the entries, a jump to the address is performed and a description is performed so as to execute the extension function program written in the jump destination. By transmitting an extension function program as necessary and storing the program in the EEPROM 9, a new extension function can be added.



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CLAIMS

[Claim(s)]

[Claim 1] A receiving means to receive the transmitted program or data, and a processing means to process said data received by said receiving means, When said extension program is received by the 1st storage means and said receiving means which memorizes the basic program which is a program about processing of said data based on said processing means, and has branching to an extension program, It has the 2nd storage means which memorizes this. Said processing means While processing said data received by said receiving means according to said basic program memorized by said 1st storage means Data reception equipment characterized by reading said extension program from said branching, and processing said data according to said extension program when said extension program is memorized by said 2nd storage means.

[Claim 2] Said extension program is data reception equipment according to claim 1 characterized by what it is compressed and is memorized by said 2nd storage means.

[Claim 3] Data reception equipment according to claim 2 characterized by having further the 3rd storage means which memorizes said developed extension program when said compressed extension program which is memorized by said 2nd storage means is developed.

[Claim 4] It is data reception equipment according to claim 3 characterized by for said 1st storage means being read-only memory, for said 2nd storage means being the memory which can hold storage also at the time of power-source OFF, and said 3rd storage means being memory from which storage is eliminated at the time of power-source OFF.

[Claim 5] Are a program about processing of data and the basic program which has branching to an extension program is memorized beforehand. When this is received when said data have been transmitted, said received data are processed according to said basic program memorized beforehand and said extension program has been transmitted, The data reception approach characterized by reading said extension program from said branching, and processing said data according to said extension program when this is received and memorized and said extension program is memorized.

[Claim 6] In the broadcast approach which encodes a picture signal from a transmitting side, broadcasts as image data, receives this image data in a receiving side, decrypts, and is displayed When it is a program about decode processing of said image data, the basic program which has branching to an extension program is beforehand memorized to said receiving side and said image data has been broadcast, When receiving this, carrying out decode processing of said image data received in said receiving side according to said basic program memorized beforehand by said receiving side and making specific decode processing perform to said receiving side, Broadcast said extension program from said transmitting side, receive to said receiving side, make it memorize, and it sets to said receiving side. The broadcast approach characterized by reading said extension program from said branching, and carrying out decode processing of said image data according to said extension program when said extension program is memorized.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention transmits the image data especially digitized by data reception equipment and the data reception approach list, for example through the broadcasting satellite or the communication satellite about the broadcast approach, when receiving this, it is used for it, and it relates to the broadcast approach at suitable data reception equipment and the data reception approach list.

[0002]

[Description of the Prior Art] Recently, a sound signal and a picture signal are digitized and the broadcast system broadcast through a satellite is spreading. By digitizing the signal to transmit, a video signal or not only a sound signal but transmission of data becomes possible.

[0003] This broadcast is receivable with the data reception equipment (decoder) of dedication. Moreover, what (for example, it enables it to receive a specific pay program) further predetermined service is offered for only to what has a specific decoder is possible by assigning the number (decoder ID) of a proper to each decoder, and identifying this decoder ID. That is, a conditional access function becomes realizable.

[0004] In current and this field, the grope about the ability to offer what kind of service continues, and possibility that service of a new gestalt will start from now on is high. For this reason, when new service starts, as for a decoder, it is desirable to constitute beforehand so that that new service can also be received. It is because a difference will be made to the service which can be used and it will become unfair by the stage which purchased the decoder, if only what purchased a new decoder enables it to receive new service.

[0005] Thus, when adding new service (new function), it is necessary to add a current update to the program of a decoder. Loading a new program to each decoder from an IC card was examined by once collecting decoders, although such a change is made conventionally, using the IC card interface which returns a decoder again, exchanges for a new thing the whole decoder, or is built in the decoder, and distributing a new IC card to each user, after exchanging the program ROM built in there.

[0006]

[Problem(s) to be Solved by the Invention] However, when there is much number of the already sold decoder, it is actually difficult to collect these. Moreover, since the memory space of an IC card was usually very small, the approach of distributing an IC card not only requires costs, but it had the technical problem that the program which can be changed was also restricted to a short thing.

[0007] This invention is made in view of such a situation, and enables it to carry out a modification addition simply also by the comparatively long program cheaply.

[0008]

[Means for Solving the Problem] A receiving means to receive the program or data with which data reception equipment according to claim 1 was transmitted, The 1st storage means which memorizes the basic program which is a program about processing of the data based on a processing means to process the data received by the receiving means, and a processing means, and has branching to an extension program, When an extension program is received by the receiving means, it has the 2nd storage means which memorizes this. A processing means While processing the data received by the receiving means according to the basic program memorized by the 1st storage means When an extension program is memorized by the 2nd storage means, an extension program is read from branching and it is

characterized by processing data according to an extension program.

[0009] An extension program can be compressed and the 2nd storage means can be made to memorize it. When the compressed extension program which is memorized by the 2nd storage means is developed, the 3rd storage means which memorizes the developed extension program can be established further.

[0010] The 1st storage means can be used as read-only memory, the 2nd storage means can be used as the memory which can hold storage also at the time of power-source OFF, and the 3rd storage means can be used as the memory from which storage is eliminated at the time of power-source OFF.

[0011] The data reception approach according to claim 5 is a program about processing of data. The basic program which has branching to an extension program is memorized beforehand. When this is received when data have been transmitted, the received data are processed according to the basic program memorized beforehand and the extension program has been transmitted, When this is received and memorized and the extension program is memorized, an extension program is read from branching and it is characterized by processing data according to an extension program.

[0012] In the broadcast approach which the broadcast approach according to claim 6 encodes a picture signal from a transmitting side, and broadcasts it as image data, receives this image data in a receiving side, decrypts, and is displayed When it is a program about decode processing of image data, the basic program which has branching to an extension program is beforehand memorized to a receiving side and image data has been broadcast, When receiving this, carrying out decode processing of the image data received in the receiving side according to the basic program memorized beforehand by the receiving side and making specific decode processing perform to a receiving side, Broadcast an extension program from a transmitting side, receive to a receiving side and it is made to memorize, when an extension program is memorized in a receiving side, an extension program is read from branching, and it is characterized by carrying out decode processing of the image data according to an extension program.

[0013]

[Function] When an extension program is needed for data reception equipment according to claim 1 and the data reception approach list according to claim 5 in the broadcast approach according to claim 6, the extension program is transmitted and memorized. When branching to an extension program is beforehand prepared for the basic program and an extension program is memorized, an extension program can be read from branching of a basic program, and data can be processed according to the extension program. Therefore, it becomes possible to transmit a new extension program suitably and to add it.

[0014]

[Example] Drawing 1 expresses the example of a configuration of the decoder for digital television broadcasting adapting the data reception equipment of this invention. An antenna 1 receives the electric wave from the satellite which is not illustrated, and outputs it to a converter 2 as an electrical signal. A converter 2 carries out the down convert of the signal received with the antenna 1 to the signal of a predetermined frequency, and outputs it to a front end 3.

[0015] After a front end 3 restores to the signal from a converter 2 and performs an error correction further, it is outputted to the transport block 4. The transport block 4 distributes the data of a packet unit inputted from the front end 3 to a video-data packet, an audio data packet, and other data packets (for example, packet of conditional access data (the extension program mentioned later is also included in this conditional access data)).

[0016] Conditional access data are sent to IC card 5A through the IC card interface 5, and the judgment of whether this decoder has an access privilege to an input signal is performed. When a judgment that it has an access privilege is made, the key for decryption (control word) is outputted to the transport block 4. The transport block 4 performs decryption processing using this control word.

[0017] The data of the video packet separated with the transport block 4 are supplied to the video decoder 10, and the data of an audio packet are supplied to the audio decoder 11. The video decoder 10 decodes the inputted video data, and outputs it to the NTSC encoder 12. The NTSC encoder 12 is outputted after encoding the inputted video data to the video signal of NTSC system.

[0018] Moreover, the audio decoder 11 decodes the inputted audio data, and outputs them as an audio signal.

[0019] CPU6 performs various kinds of processings according to the program memorized by ROM7. And RAM8 is made to memorize data required for processing etc. suitably. It is made as [memorize / the data (for example, a password and the channel number which was being seen just before turning off a power source) which have the need of

holding even after turning off the power source of this decoder in EEPROM9 as nonvolatile and rewritable memory].
 [0020] When used as what memorizes suitably data with the need of holding after power-source off etc., the capacity of EEPROM9 is good at most at hundreds of bytes. However, in this example, an extension program is written in this EEPROM9. For this reason, capacity of EEPROM9 is made into 32 K bytes in this example.

[0021] Next, the actuation is explained. When the power source of a decoder is turned on, CPU6 controls each block and makes reception actuation start according to the program memorized by ROM7. Thereby, a front end 3 receives the signal received with the antenna 1 through a converter 2, and gets over. A recovery signal is supplied to the transport block 4, after an error correction is given. The transport block 4 separates the inputted packet data from Packet ID, supplies a video data to the video decoder 10, and supplies audio data to the audio decoder 11.

[0022] The video decoder 10 decodes the inputted video data, and outputs it to the NTSC encoder 12. The NTSC encoder 12 changes and outputs the inputted video data to the video signal of NTSC system. Moreover, the audio decoder 11 decodes the inputted audio data, and outputs them as an audio signal.

[0023] Thus, it can view and listen with the monitoring device which does not illustrate the image and voice corresponding to the image data and voice data which were broadcast through the satellite.

[0024] The transport block 4 supplies this to IC card 5A through the IC card interface 5, when conditional access data are inputted. CPU built in IC card 5A requires read-out of the decoder ID currently assigned to CPU6 through the transport block 4 at this decoder. When this demand is received, CPU6 reads the decoder ID memorized by ROM7 (or EEPROM9), and supplies it to IC card 5A through the transport block 4.

[0025] CPU of IC card 5A judges whether it is the decoder ID in which this decoder ID has an access privilege to conditional access data, and when it judges with it being the decoder ID which has an access privilege, it supplies control word to the transport block 4. In the transport block 4, decryption processing of conditional access data is performed using this control word.

[0026] An extension program is also included in this conditional access data.

[0027] That is, an extension program is also enciphered and it is transmitted through a satellite as two or more packets containing the predetermined decoder ID. For this reason, the decoder ID which has the specific decoder ID has an access privilege to these packets, and can perform that decryption. Thereby, only the user who paid the predetermined addition tariff becomes possible [adding predetermined extension].

[0028] CPU6 makes EEPROM9 transmit and memorize the extension block decoded with the transport block 4.

[0029] Drawing 2 expresses typically the basic program memorized by ROM7 and the extension program memorized by EEPROM9.

[0030] That is, the step of branching to an extension program is contained in the basic program memorized by ROM7 to the address a1. [when the address memorized by the entry t1 of EEPROM9 thru/or t3 is read to this branching step and that address is 0] [when error processing is performed and the predetermined address is written in as that the extension program is not remembered to be] The address of EEPROM9 is accessed and it is indicated that the extension program memorized to the address is read and set.

[0031]

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TECHNICAL FIELD

[Industrial Application] This invention transmits the image data especially digitized by data reception equipment and the data reception approach list, for example through the broadcasting satellite or the communication satellite about the broadcast approach, when receiving this, it is used for it, and it relates to the broadcast approach at suitable data reception equipment and the data reception approach list.

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PRIOR ART

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[0003] This broadcast is receivable with the data reception equipment (decoder) of dedication. Moreover, what (for example, it enables it to receive a specific pay program) further predetermined service is offered for only to what has a specific decoder is possible by assigning the number (decoder ID) of a proper to each decoder, and identifying this decoder ID. That is, a conditional access function becomes realizable.

[0004] In current and this field, the grope about the ability to offer what kind of service continues, and possibility that service of a new gestalt will start from now on is high. For this reason, when new service starts, as for a decoder, it is desirable to constitute beforehand so that that new service can also be received. It is because a difference will be made to the service which can be used and it will become unfair by the stage which purchased the decoder, if only what purchased a new decoder enables it to receive new service.

[0005] Thus, when adding new service (new function), it is necessary to add a current update to the program of a decoder. Loading a new program to each decoder from an IC card was examined by once collecting decoders, although such a change is made conventionally, using the IC card interface which returns a decoder again, exchanges for a new thing the whole decoder, or is built in the decoder, and distributing a new IC card to each user, after exchanging the program ROM built in there.

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EFFECT OF THE INVENTION

[Effect of the Invention] When an extension program is needed for data reception equipment according to claim 1 and the data reception approach list according to claim 5 in the broadcast approach according to claim 6, the extension program is transmitted and memorized. When branching to an extension program is beforehand prepared for the basic program and an extension program is memorized, an extension program can be read from branching of a basic program, and data can be processed according to the extension program. Therefore, it becomes possible to transmit a new extension program suitably and to add it.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, when there is much number of the already sold decoder, it is actually difficult to collect these. Moreover, since the memory space of an IC card was usually very small, the approach of distributing an IC card not only requires costs, but it had the technical problem that the program which can be changed was also restricted to a short thing.

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MEANS

[Means for Solving the Problem] A receiving means to receive the program or data with which data reception equipment according to claim 1 was transmitted, The 1st storage means which memorizes the basic program which is a program about processing of the data based on a processing means to process the data received by the receiving means, and a processing means, and has branching to an extension program, When an extension program is received by the receiving means, it has the 2nd storage means which memorizes this. A processing means While processing the data received by the receiving means according to the basic program memorized by the 1st storage means When an extension program is memorized by the 2nd storage means, an extension program is read from branching and it is characterized by processing data according to an extension program.

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OPERATION

[Function] When an extension program is needed for data reception equipment according to claim 1 and the data reception approach list according to claim 5 in the broadcast approach according to claim 6, the extension program is transmitted and memorized. When branching to an extension program is beforehand prepared for the basic program and an extension program is memorized, an extension program can be read from branching of a basic program, and data can be processed according to the extension program. Therefore, it becomes possible to transmit a new extension program suitably and to add it.

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EXAMPLE

[Example] Drawing 1 expresses the example of a configuration of the decoder for digital television broadcasting adapting the data reception equipment of this invention. An antenna 1 receives the electric wave from the satellite which is not illustrated, and outputs it to a converter 2 as an electrical signal. A converter 2 carries out the down convert of the signal received with the antenna 1 to the signal of a predetermined frequency, and outputs it to a front end 3.

[0015] After a front end 3 restores to the signal from a converter 2 and performs an error correction further, it is outputted to the transport block 4. The transport block 4 distributes the data of a packet unit inputted from the front end 3 to a video-data packet, an audio data packet, and other data packets (for example, packet of conditional access data (the extension program mentioned later is also included in this conditional access data)).

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[0018] Moreover, the audio decoder 11 decodes the inputted audio data, and outputs them as an audio signal.

[0019] CPU6 performs various kinds of processings according to the program memorized by ROM7. And RAM8 is made to memorize data required for processing etc. suitably. It is made as [memorize / the data (for example, a password and the channel number which was being seen just before turning off a power source) which have the need of holding even after turning off the power source of this decoder in EEPROM9 as nonvolatile and rewritable memory].

[0020] When used as what memorizes suitably data with the need of holding after power-source off etc., the capacity of EEPROM9 is good at most at hundreds of bytes. However, in this example, an extension program is written in this EEPROM9. For this reason, capacity of EEPROM9 is made into 32 K bytes in this example.

[0021] Next, the actuation is explained. When the power source of a decoder is turned on, CPU6 controls each block and makes reception actuation start according to the program memorized by ROM7. Thereby, a front end 3 receives the signal received with the antenna 1 through a converter 2, and gets over. A recovery signal is supplied to the transport block 4, after an error correction is given. The transport block 4 separates the inputted packet data from Packet ID, supplies a video data to the video decoder 10, and supplies audio data to the audio decoder 11.

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[0023] Thus, it can view and listen with the monitoring device which does not illustrate the image and voice corresponding to the image data and voice data which were broadcast through the satellite.

[0024] The transport block 4 supplies this to IC card 5A through the IC card interface 5, when conditional access data are inputted. CPU built in IC card 5A requires read-out of the decoder ID currently assigned to CPU6 through the transport block 4 at this decoder. When this demand is received, CPU6 reads the decoder ID memorized by ROM7 (or EEPROM9), and supplies it to IC card 5A through the transport block 4.

[0025] CPU of IC card 5A judges whether it is the decoder ID in which this decoder ID has an access privilege to conditional access data, and when it judges with it being the decoder ID which has an access privilege, it supplies control word to the transport block 4. In the transport block 4, decryption processing of conditional access data is performed using this control word.

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[0027] That is, an extension program is also enciphered and it is transmitted through a satellite as two or more packets containing the predetermined decoder ID. For this reason, the decoder ID which has the specific decoder ID has an access privilege to these packets, and can perform that decryption. Thereby, only the user who paid the predetermined addition tariff becomes possible [adding predetermined extension].

[0028] CPU6 makes EEPROM9 transmit and memorize the extension block decoded with the transport block 4.

[0029] Drawing 2 expresses typically the basic program memorized by ROM7 and the extension program memorized by EEPROM9.

[0030] That is, the step of branching to an extension program is contained in the basic program memorized by ROM7 to the address a1. [when the address memorized by the entry t1 of EEPROM9 thru/or t3 is read to this branching step and that address is 0] [when error processing is performed and the predetermined address is written in as that the extension program is not remembered to be] The address of EEPROM9 is accessed and it is indicated that the extension program memorized to the address is read and set.

[0031] In the example of drawing 2, the address f1 is described by the entry t1 of EEPROM9, and the address f2 is described by the entry t2. And the extension program 1 is written in the address f1 of EEPROM9, and the extension program 2 is written in the address f2. Therefore, processing of these extension programs 1 or 2 is performed.

[0032] In the case of this example, 0 is written in the entry t3 of EEPROM9. Therefore, in this example, only two extension is able to use among three extension, and the 3rd extension program is in the condition that it cannot use yet.

[0033] Generally compared with RAM8, an access rate is slow, EEPROM9 has a small capacity and it is expensive. For this reason, it will become cost quantity if capacity of EEPROM9 is enlarged not much. When making it save where an extension program is compressed into EEPROM9 and starting the time of power-source ON, or a program there, the extension program in the compressed condition that EEPROM9 memorizes is developed (expanding), and it can write in RAM8.

[0034] Drawing 3 expresses the example in this case. That is, it is the same as that of the case where it mentions above that the extension program transmitted through a satellite is written in EEPROM9. However, in the example of this drawing 3, an extension program is in a condition [being compressed] and memorized by EEPROM9. Thereby, even if it does not enlarge capacity of EEPROM9 so much, it becomes possible to hold a comparatively long program to EEPROM9.

[0035] As an approach of compressing a program, the loss loess (lossless) mold data compression approach (reversible coding method), i.e., the compression method which can be completely restored to the original data if it develops (elongation), is used. As this approach, run length (run length) coding, Huffman (Huffman) coding, algebraic-sign-izing, or a Lempel-Ziv method can be held, for example. About these methods, it is indicated by the 94th page of "Nikkei electronics" 1993.5.10 (No.580) thru/or the 117th page, for example.

[0036] And in the case of this example, performing processing which develops the compressed extension program which is memorized by EEPROM9 is described by the address a0 of ROM7 at the time of power-source starting of an encoder. Thereby, the extension table memorized by EEPROM9 develops to RAM8, and is memorized. the entry t1 of EEPROM9 thru/or the description [in / the case of the example of drawing 3 / in the entry T1 thru/or T3 of RAM8 / t3] f1 and f -- 2 and 0 -- corresponding -- respectively -- Addresses F1 and F -- 2 and 0 are described. And in the address F1 of RAM8, the extension program 1 in the condition of having been developed is memorized, and the extension program 2 in the condition of having been developed is memorized in the address F2.

[0037] And the entry T1 thru/or T3 of RAM8 is described by the branching step to the extension program of the address a1 of ROM7. Therefore, activation of the extension program 1 memorized like the case in the example of drawing 2 to the address F1 of RAM8 currently written in the entry T1, the extension program 2 memorized to the address F2 currently written in the entry T2 is attained.

[0038] These extension programs developed by RAM8 will be eliminated when the power source of a decoder is turned off unlike the case in EEPROM9. For this reason, whenever this processing to develop turns on a power source, it is needed. However, it is possible to use until it turns off a power source after that, when it once develops.

[0039] However, when it is expected that the storage regions of RAM8 run short, this extension program can be eliminated corresponding to the command from a user, when it becomes unnecessary.

[0040] It becomes possible to make available the electronic program guide (EPG:Electrically Program Guide) for making game software use or choosing a desired broadcast channel from many broadcast channels only to a specific decoder, as mentioned above, for example, or to make possible the monitor of a pay-per-view (pay per view) image.

[0041] Or when the broadcast approach is changed so that audio data may also scramble after that the thing which scrambles only a video data among a video data and audio data (encryption), and he was trying to broadcast again, the program for descrambling this scrambled audio data is transmitted to each encoder (receiving side) from a broadcasting station (transmitting side), and it can make it possible to also descramble audio data.

[0042] In addition, in the above-mentioned example, although EEPROM was used as memory for holding at the time of power-source OFF, in addition if it is nonvolatile and rewritable memory, it is also possible to use other memory. Moreover, timing which develops the compressed program (expanding) can also be considered as the time of using it.

[Translation done.]

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- 3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing the example of a configuration of the decoder for digital television broadcasting adapting the data reception equipment of this invention.

[Drawing 2] It is drawing explaining the program memorized by ROM7 and EEPROM9 of drawing 1 .

[Drawing 3] It is drawing explaining the program memorized by ROM7, RAM8, and EEPROM9 which are shown in drawing 1 .

[Description of Notations]

- 1 Antenna
- 2 Converter
- 3 Front End
- 4 Transport Block
- 5 IC Card Interface
- 5A IC card
- 6 CPU
- 7 ROM
- 8 RAM
- 9 EEPROM
- 10 Video Decoder
- 11 Audio Decoder
- 12 NTSC Encoder

[Translation done.]

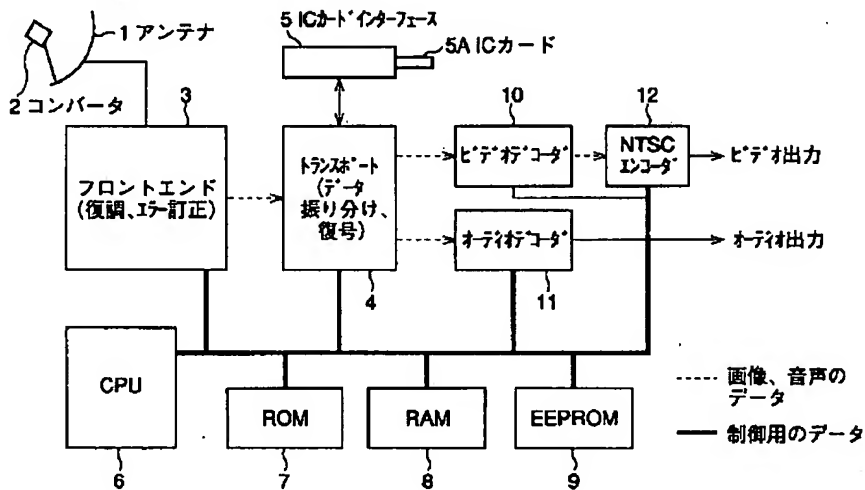
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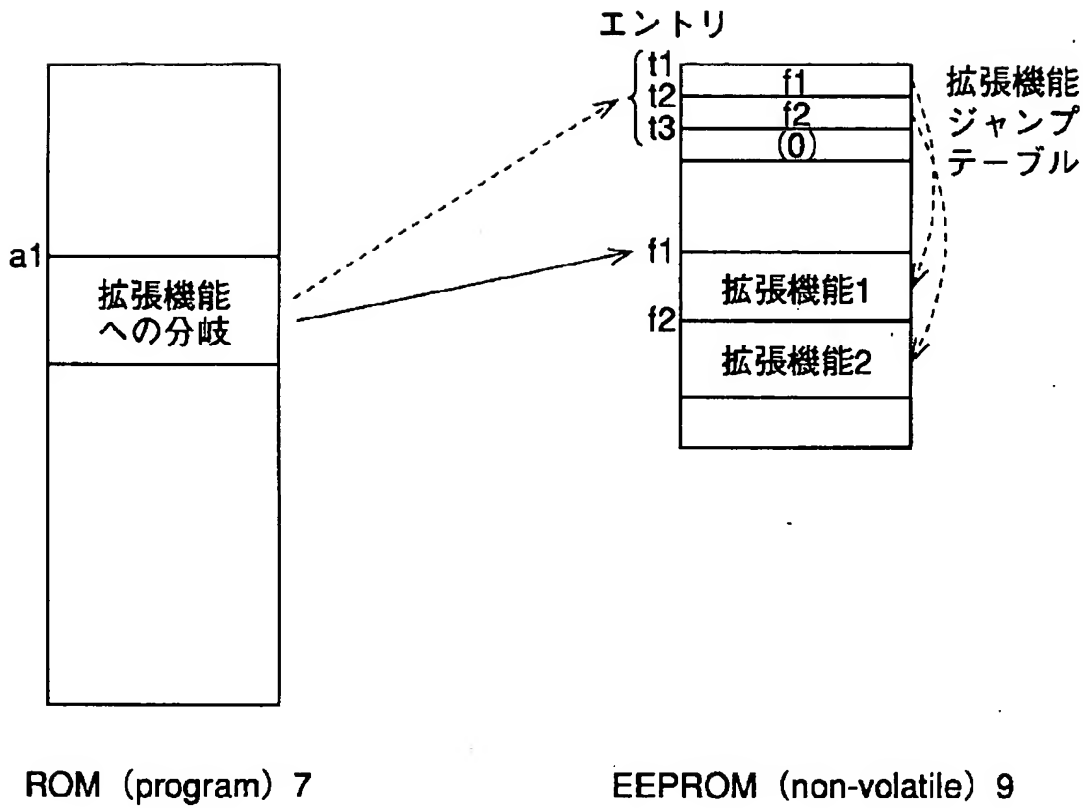
- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
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DRAWINGS

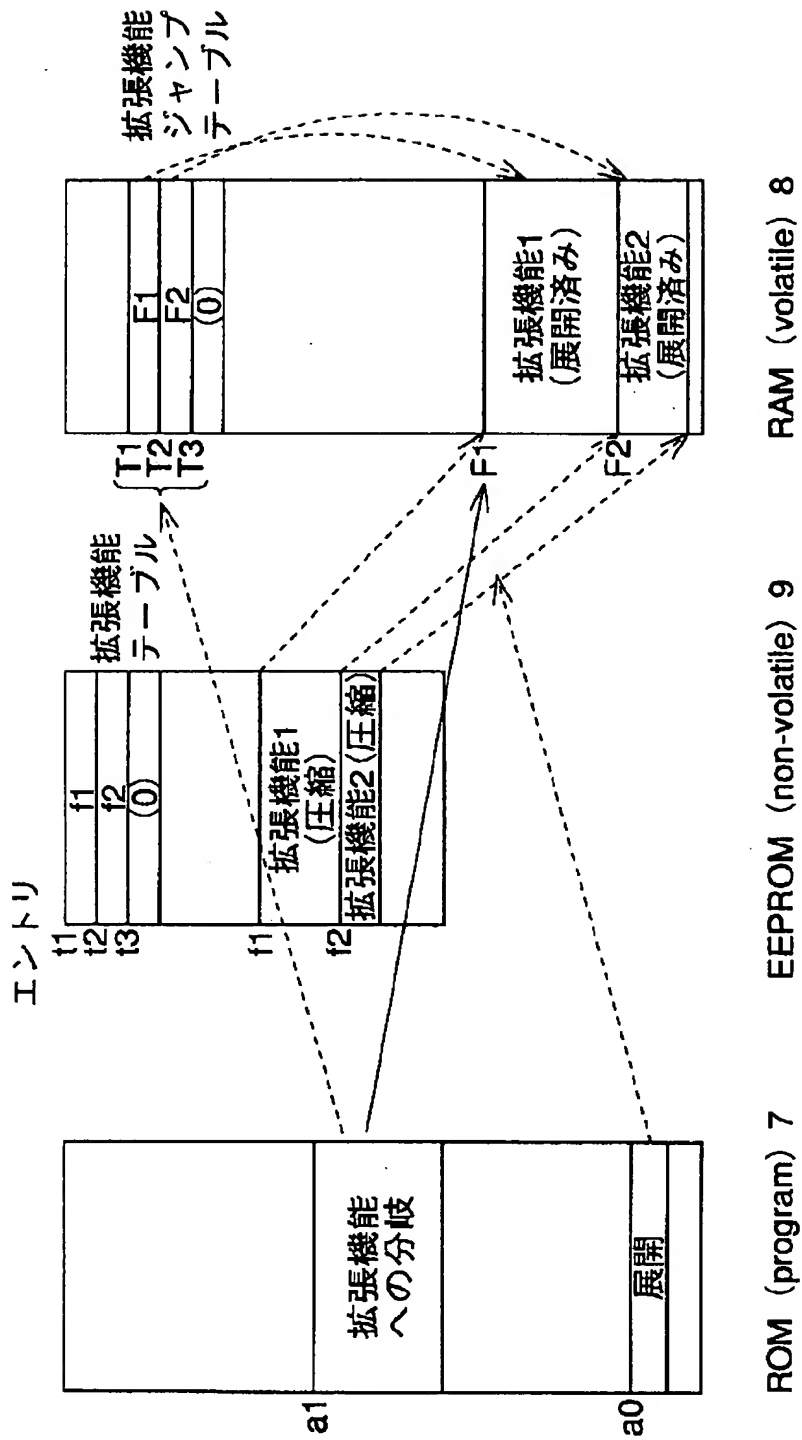
[Drawing 1]



[Drawing 2]



[Drawing 3]



[Translation done.]

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CORRECTION OR AMENDMENT

[Kind of official gazette] Printing of amendment by the convention of 2 of Article 17 of Patent Law
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[Procedure revision]
 [Filing Date] February 8, Heisei 12 (2000. 2.8)
 [Procedure amendment 1]
 [Document to be Amended] Specification
 [Item(s) to be Amended] Whole sentence
 [Method of Amendment] Modification
 [Proposed Amendment]
 [Document Name] Specification
 [Title of the Invention] It is the broadcast approach to data reception equipment and the data reception approach list.
 [Claim(s)]

[Claim 1] A transmitted receiving means to receive the data with which the 1st program compressed is included suitably,

An extract means to extract said 1st program from said data when said data are received by said receiving means,
 The 1st storage means which was extracted by said extract means and which memorizes said 1st program compressed,
 An expansion means memorized by said 1st storage means to develop said 1st program compressed,
 The 2nd storage means which memorizes said 1st program developed by said expansion means,
 A processing means memorized by said 2nd storage means to perform predetermined processing according to said 1st program developed

Data reception equipment characterized by preparation *****.

[Claim 2] Said 1st storage means to memorize said 1st program compressed contains the memory which can hold storage also at the time of power-source OFF.

Data reception equipment according to claim 1 characterized by things.

[Claim 3] Said 2nd storage means contains the memory which eliminates storage at the time of power-source OFF, It has further the control means which is memorized by said 1st storage means and which controls the timing of expansion processing of said expansion means so that it is developed at the time of power-source ON and said 1st program compressed is memorized by said 2nd storage means.

Data reception equipment according to claim 2 characterized by things.

[Claim 4] It has further the control means which controls the timing of expansion processing of said expansion means so that it may be developed when using it, and said 1st program which is memorized by said 1st storage means and which is compressed may be memorized by said 2nd storage means.

Data reception equipment according to claim 2 characterized by things.

[Claim 5] It has further the 3rd storage means which memorizes the 2nd program relevant to said 1st program, Said 2nd storage means remembers said 1st program developed by said expansion means that said processing means can perform predetermined processing according to said 1st program in relation to said 2nd program.

Data reception equipment according to claim 1 characterized by things.

[Claim 6] Said 3rd storage means memorizes said 2nd program which can be branched to said 1st program, Said 2nd storage means memorizes said 1st program developed by said expansion means in the location specified by branching of said 2nd program.

Data reception equipment according to claim 5 characterized by things.

[Claim 7] While said processing means performs predetermined processing according to said 2nd program memorized by said 3rd storage means When said 1st program is memorized by said 2nd storage means, said 1st program is read from the location specified by branching of said 2nd program of said 2nd storage means, and processing is performed according to said 1st program.

Data reception equipment according to claim 6 characterized by things.

[Claim 8] Said 3rd storage means contains read-only memory.

Data reception equipment according to claim 5 characterized by things.

[Claim 9] Said 1st program is an extension program,

Said 2nd program is data reception equipment according to claim 5 characterized by being a basic program.

[Claim 10] The transmitted receiving step which receives the data with which the program compressed is included suitably,

The extract step which extracts said program from said data when said data are received by processing of said receiving step,

The 1st storage step which was extracted by processing of said extract step and which memorizes said program compressed,

The expansion step which was memorized by processing of said 1st storage step and which develops said program compressed,

The 2nd storage step which memorizes said program developed by processing of said expansion step,

The processing step which was memorized by processing of said 2nd storage step and which performs predetermined processing according to said program developed

***** -- the data reception approach characterized by things.

[Claim 11] In the broadcast approach which encodes a picture signal from a transmitting side, broadcasts as image data, receives said image data in a receiving side, decodes, and is displayed,

The receiving step which receives said image data in which the program which has been transmitted from said transmitting side, and which is compressed is included suitably,

The extract step which extracts said program from said image data in said receiving side when said image data is received by processing of said receiving step,

The 1st storage step which was extracted by processing of said extract step and which memorizes said program compressed in said receiving side,

The expansion step which was memorized by processing of said 1st storage step and which develops said program

compressed in said receiving side,

The 2nd storage step which memorizes said program developed by processing of said expansion step in said receiving side,

The broadcast approach characterized by including the processing step which was memorized by processing of said 2nd storage step, and which performs predetermined processing in said receiving side according to said program developed.

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention transmits the image data especially digitized by data reception equipment and the data reception approach list, for example through the broadcasting satellite or the communication satellite about the broadcast approach, when receiving this, it is used for it, and it relates to the broadcast approach at suitable data reception equipment and the data reception approach list.

[0002]

[Description of the Prior Art] Recently, a sound signal and a picture signal are digitized and the broadcast system broadcast through a satellite is spreading. By digitizing the signal to transmit, a video signal or not only a sound signal but transmission of data becomes possible.

[0003] This broadcast is receivable with the data reception equipment (decoder) of dedication. Moreover, what (for example, it enables it to receive a specific pay program) further predetermined service is offered for only to what has a specific decoder is possible by assigning the number (decoder ID) of a proper to each decoder, and identifying this decoder ID. That is, a conditional access function becomes realizable.

[0004] In current and this field, the grope about the ability to offer what kind of service continues, and possibility that service of a new gestalt will start from now on is high. For this reason, when new service starts, as for a decoder, it is desirable to constitute beforehand so that that new service can also be received. It is because a difference will be made to the service which can be used and it will become unfair by the stage which purchased the decoder, if only what purchased a new decoder enables it to receive new service.

[0005] Thus, when adding new service (new function), it is necessary to add a current update to the program of a decoder. Loading a new program to each decoder from an IC card was examined by once collecting decoders, although such a change is made conventionally, using the IC card interface which returns a decoder again, exchanges for a new thing the whole decoder, or is built in the decoder, and distributing a new IC card to each user, after exchanging the program ROM built in there.

[0006]

[Problem(s) to be Solved by the Invention] However, when there is much number of the already sold decoder, it is actually difficult to collect these. Moreover, since the memory space of an IC card was usually very small, the approach of distributing an IC card not only requires costs, but it had the technical problem that the program which can be changed was also restricted to a short thing.

[0007] This invention is made in view of such a situation, and enables it to carry out a modification addition simply also by the comparatively long program cheaply.

[0008]

[Means for Solving the Problem] This invention is characterized by providing the following to data reception equipment. A transmitted receiving means to receive the data with which the 1st program compressed is included suitably An extract means to extract the 1st program from data when data are received by the receiving means The 1st storage means which was extracted by the extract means and which memorizes the 1st program compressed A processing means memorized by an expansion means memorized by the 1st storage means develop the 1st program compressed, the 2nd storage means which memorizes the 1st program developed by the expansion means, and the 2nd storage means perform predetermined processing according to the 1st program developed

[0009] In the data reception equipment of this invention, from the transmitted data, the 1st program is extracted and the 1st storage means memorizes. This 1st program is compressed, and after being developed by the expansion means to predetermined timing, it is memorized by the 2nd storage means. A processing means performs predetermined processing according to the 1st developed program.

[0010] Said 1st storage means to memorize said 1st program compressed can contain the memory which can hold storage also at the time of power-source OFF. The control means including the memory which eliminates storage at the

time of power-source OFF which are memorized by said 1st storage means and which control the timing of expansion processing of said expansion means so that it is developed at the time of power-source ON and said 1st program compressed is memorized by said 2nd storage means can be further prepared in said 2nd storage means. The control means which controls the timing of expansion processing of said expansion means can be further established so that it may be developed when using it, and said 1st program which is memorized by said 1st storage means and which is compressed may be memorized by said 2nd storage means. The 3rd storage means which memorizes the 2nd program relevant to said 1st program is established further, and said 2nd storage means can remember said 1st program developed by said expansion means that said processing means can perform predetermined processing according to said 1st program in relation to said 2nd program. Said 3rd storage means memorizes said 2nd program which can be branched to said 1st program, and said 2nd storage means can memorize said 1st program developed by said expansion means in the location specified by branching of said 2nd program. While said processing means performs predetermined processing according to said 2nd program memorized by said 3rd storage means When said 1st program is memorized by said 2nd storage means, said 1st program is read from the location specified by branching of said 2nd program of said 2nd storage means, and processing can be performed according to said 1st program. Said 3rd storage means can contain read-only memory. Said 1st program can be considered as an extension program, and said 2nd program can be made into a basic program.

[0011] This invention is characterized by providing the following in the data reception approach. The receiving step which receives the data with which a program is extracted and the program by which account transmission has been carried out, and which is compressed is suitably included in the 1st storage means from the transmitted data The extract step which extracts a program from data when data are received by processing of a receiving step The 1st storage step which was extracted by processing of an extract step and which memorizes the program compressed The processing step which was memorized by processing of the expansion step which was memorized by processing of the 1st storage step, and which develops the program compressed, the 2nd storage step which memorizes the program developed by processing of an expansion step, and the 2nd storage step and which performs in predetermined processing according to the program developed In the data reception approach of this invention, from the transmitted data, a program is extracted and it is remembered that maintenance becomes possible also at the time of power-source OFF. This program is compressed, and after being developed to predetermined timing, it is memorized. Predetermined processing is performed according to the developed program.

[0012] This invention is characterized by providing the following in the broadcast approach. The receiving step which has been transmitted from the transmitting side and which receives the image data in which the program compressed is included suitably The extract step which extracts a program from image data in a receiving side when image data is received by processing of a receiving step The 1st storage step which was extracted by processing of an extract step and which memorizes the program compressed in a receiving side The processing step which was memorized by processing of the expansion step which was memorized by processing of the 1st storage step, and which develops the program compressed in a receiving side, the 2nd storage step which memorizes the program developed by processing of an expansion step in a receiving side, and the 2nd storage step and which performs in predetermined processing in a receiving side according to the program developed

[0013] In the broadcast approach of this invention, a program is extracted and memorized from the image data transmitted from the transmitting side. This program is compressed, and after being developed to predetermined timing, it is memorized again. Predetermined processing is performed according to the developed program.

[0014]

[Embodiment of the Invention] Drawing 1 expresses the example of a configuration of the decoder for digital television broadcasting adapting the data reception equipment of this invention. An antenna 1 receives the electric wave from the satellite which is not illustrated, and outputs it to a converter 2 as an electrical signal. A converter 2 carries out the down convert of the signal received with the antenna 1 to the signal of a predetermined frequency, and outputs it to a front end 3.

[0015] After a front end 3 restores to the signal from a converter 2 and performs an error correction further, it is outputted to the transport block 4. The transport block 4 distributes the data of a packet unit inputted from the front end 3 to a video-data packet, an audio data packet, and other data packets (for example, packet of conditional access data (the extension program mentioned later is also included in this conditional access data)).

[0016] Conditional access data are sent to IC card 5A through the IC card interface 5, and the judgment of whether this

decoder has an access privilege to an input signal is performed. When a judgment that it has an access privilege is made, the key for decryption (control word) is outputted to the transport block 4. The transport block 4 performs decryption processing using this control word.

[0017] The data of the video packet separated with the transport block 4 are supplied to the video decoder 10, and the data of an audio packet are supplied to the audio decoder 11. The video decoder 10 decodes the inputted video data, and outputs it to the NTSC encoder 12. The NTSC encoder 12 is outputted after encoding the inputted video data to the video signal of NTSC system.

[0018] Moreover, the audio decoder 11 decodes the inputted audio data, and outputs them as an audio signal.

[0019] CPU6 performs various kinds of processings according to the program memorized by ROM7. And RAM8 is made to memorize data required for processing etc. suitably. It is made as [memorize / the data (for example, a password and the channel number which was being seen just before turning off a power source) which have the need of holding even after turning off the power source of this decoder in EEPROM9 as nonvolatile and rewritable memory].

[0020] When used as what memorizes suitably data with the need of holding after power-source off etc., the capacity of EEPROM9 is good at most at hundreds of bytes. However, in the gestalt of this operation, an extension program is written in this EEPROM9. For this reason, capacity of EEPROM9 is made into 32 K bytes in the gestalt of this operation.

[0021] Next, the actuation is explained. When the power source of a decoder is turned on, CPU6 controls each block and makes reception actuation start according to the program memorized by ROM7. Thereby, a front end 3 receives the signal received with the antenna 1 through a converter 2, and gets over. A recovery signal is supplied to the transport block 4, after an error correction is given. The transport block 4 separates the inputted packet data from Packet ID, supplies a video data to the video decoder 10, and supplies audio data to the audio decoder 11.

[0022] The video decoder 10 decodes the inputted video data, and outputs it to the NTSC encoder 12. The NTSC encoder 12 changes and outputs the inputted video data to the video signal of NTSC system. Moreover, the audio decoder 11 decodes the inputted audio data, and outputs them as an audio signal.

[0023] Thus, it can view and listen with the monitoring device which does not illustrate the image and voice corresponding to the image data and voice data which were broadcast through the satellite.

[0024] The transport block 4 supplies this to IC card 5A through the IC card interface 5, when conditional access data are inputted. CPU built in IC card 5A requires read-out of the decoder ID currently assigned to CPU6 through the transport block 4 at this decoder. When this demand is received, CPU6 reads the decoder ID memorized by ROM7 (or EEPROM9), and supplies it to IC card 5A through the transport block 4.

[0025] CPU of IC card 5A judges whether it is the decoder ID in which this decoder ID has an access privilege to conditional access data, and when it judges with it being the decoder ID which has an access privilege, it supplies control word to the transport block 4. In the transport block 4, decryption processing of conditional access data is performed using this control word.

[0026] An extension program is also included in this conditional access data.

[0027] That is, an extension program is also enciphered and it is transmitted through a satellite as two or more packets containing the predetermined decoder ID. For this reason, only the decoder which has the specific decoder ID has an access privilege to these packets, and can perform that decryption. Thereby, only the user who paid the predetermined addition tariff becomes possible [adding predetermined extension].

[0028] CPU6 makes EEPROM9 transmit and memorize the extension program decoded with the transport block 4.

[0029] Drawing 2 expresses typically the basic program memorized by ROM7 and the extension program memorized by EEPROM9.

[0030] That is, the step of branching to an extension program is contained in the basic program memorized by ROM7 to the address a1. The address memorized by the entry t1 of EEPROM9 thru/or t3 is read, this branching step performs error processing as that the extension program is not remembered to be, when that address is 0, when the predetermined address is written in, it accesses that address of EEPROM9, and it is programmed so that the extension program memorized to that address may be read.

[0031] In the example of drawing 2, the address f1 is described by the entry t1 of EEPROM9, and the address f2 is described by the entry t2. And the extension program 1 is written in the address f1 of EEPROM9, and the extension program 2 is written in the address f2. Therefore, processing of these extension programs 1 or 2 is performed.

[0032] In the case of this example, 0 is written in the entry t3 of EEPROM9. Therefore, in this example, only two

extension is able to use among three extension, and the 3rd extension program is in the condition that it cannot use yet. [0033] Generally compared with RAM8, an access rate is slow, EEPROM9 has a small capacity and it is expensive. For this reason, if an extension program is lengthened, it will be necessary to enlarge capacity of EEPROM9 but, and in the example of drawing 2, if capacity of EEPROM9 is enlarged not much, it will become cost quantity. When making it save where an extension program is compressed into EEPROM9 and starting the time of power-source ON, or a program there, the extension program in the compressed condition that EEPROM9 memorizes is developed (expanding), and it can write in RAM8.

[0034] Drawing 3 expresses the gestalt of operation in this case. That is, it is the same as that of the case where it mentions above that the extension program transmitted through a satellite is written in EEPROM9. However, in the gestalt of operation of this drawing 3, an extension program is in a condition [being compressed] and memorized by EEPROM9. Thereby, even if it does not enlarge capacity of EEPROM9 so much, it becomes possible to hold a comparatively long program to EEPROM9.

[0035] As an approach of compressing a program, the loss loess (lossless) mold data compression approach (reversible coding method), i.e., the compression method which can be completely restored to the original data if it develops (elongation), is used. As this approach, run length (run length) coding, Huffman (Huffman) coding, algebraic-sign-izing, or a Lempel-Ziv method can be held, for example. About these methods, it is indicated by the 94th page of "Nikkei electronics" 1993.5.10 (No.580) thru/or the 117th page, for example.

[0036] And in the case of the gestalt of this operation, performing processing which develops the compressed extension program which is memorized by EEPROM9 is described by the address a0 of ROM7 at the time of power-source starting of an encoder. Thereby, the extension table memorized by EEPROM9 develops to RAM8, and is memorized. the entry t1 of EEPROM9 thru/or the description [in / the case of the gestalt of operation of drawing 3 / in the entry T1 thru/or T3 of RAM8 / t3] f1 and f -- 2 and 0 -- corresponding -- respectively -- Addresses F1 and F -- 2 and 0 are described. And in the address F1 of RAM8, the extension program 1 in the condition of having been developed is memorized, and the extension program 2 in the condition of having been developed is memorized in the address F2.

[0037] And the entry T1 thru/or T3 of RAM8 is described by the branching step to the extension program of the address a1 of ROM7. Therefore, activation of the extension program 1 memorized like the case in the example of drawing 2 to the address F1 of RAM8 currently written in the entry T1, the extension program 2 memorized to the address F2 currently written in the entry T2 is attained.

[0038] These extension programs developed by RAM8 will be eliminated when the power source of a decoder is turned off unlike the case in EEPROM9. For this reason, whenever this processing to develop turns on a power source, it is needed. However, it is possible to use until it turns off a power source after that, when it once develops.

[0039] However, when it is expected that the storage regions of RAM8 run short, this extension program can be eliminated corresponding to the command from a user, when it becomes unnecessary.

[0040] It becomes possible to make available the electronic program guide (EPG:Electrically Program Guide) for making game software use or choosing a desired broadcast channel from many broadcast channels only to a specific decoder, as mentioned above, for example, or to make possible the monitor of a pay-per-view (pay per view) image.

[0041] Or when the broadcast approach is changed so that audio data may also scramble after that the thing which scrambles only a video data among a video data and audio data (encryption), and he was trying to broadcast again, the program for descrambling this scrambled audio data is transmitted to each encoder (receiving side) from a broadcasting station (transmitting side), and it can make it possible to also descramble audio data.

[0042] In addition, in the gestalt of the above-mentioned implementation, although EEPROM was used as MORI for holding at the time of power-source OFF, in addition if it is nonvolatile and rewritable memory, it is also possible to use other memory. Moreover, timing which develops the compressed program (expanding) can also be considered as the time of using it.

[0043]

[Effect of the Invention] According to the data reception equipment and the data reception approach of this invention, from the transmitted data Since the program compressed is extracted and memorized, it develops to predetermined timing and predetermined processing was made to perform according to the developed program It becomes possible to carry out the current update of the comparatively long program transmitted suitably with cheap equipment simply, without enlarging storage capacity of the memory which memorizes a program. The program which is compressed in the receiving side from the image data transmitted from the transmitting side according to the broadcast approach of

this invention extracts, it memorizes, and it develops, and it becomes that it is possible in carrying out the current update of the comparatively long program suitably transmitted from the transmitting side with cheap equipment simply, without enlarging the storage capacity of the memory which memorizes a program, since it was made to perform predetermined processing according to the developed program.

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing the example of a configuration of the decoder for digital television broadcasting adapting the data reception equipment of this invention.

[Drawing 2] It is drawing explaining the program memorized by ROM7 and EEPROM9 of drawing 1.

[Drawing 3] It is drawing explaining the program memorized by ROM7, RAM8, and EEPROM9 which are shown in drawing 1.

[Description of Notations]

1 Antenna, 12 NTSC Encoder 2 Converter 3 Front End 4 Transport Block 5 IC Card Interface 5A IC Card 6CPU 7 ROM 8 RAM 9 EEPROM 10 Video Decoder 11 Audio Decoder

[Translation done.]

【特許請求の範囲】

【請求項 1】 伝送されたプログラムまたはデータを受信する受信手段と、

前記受信手段により受信された前記データを処理する処理手段と、

前記処理手段による前記データの処理に関するプログラムであって、拡張機能プログラムへの分岐を有する基本プログラムを記憶する第 1 の記憶手段と、

前記受信手段により前記拡張機能プログラムが受信されたとき、これを記憶する第 2 の記憶手段とを備え、

前記処理手段は、前記受信手段により受信された前記データを、前記第 1 の記憶手段に記憶されている前記基本プログラムにしたがって処理するとともに、前記第 2 の記憶手段に前記拡張機能プログラムが記憶されたとき、前記分岐から前記拡張機能プログラムを読み出し、前記拡張機能プログラムにしたがって前記データを処理することを特徴とするデータ受信処理装置。

【請求項 2】 前記拡張機能プログラムは圧縮されて前記第 2 の記憶手段に記憶されていることを特徴とする請求項 1 に記載のデータ受信処理装置。

【請求項 3】 前記第 2 の記憶手段に記憶されている、圧縮された前記拡張機能プログラムが展開されたとき、展開された前記拡張機能プログラムを記憶する第 3 の記憶手段をさらに備えることを特徴とする請求項 2 に記載のデータ受信処理装置。

【請求項 4】 前記第 1 の記憶手段は、読み出し専用のメモリであり、

前記第 2 の記憶手段は、電源オフ時にも記憶を保持可能なメモリであり、

前記第 3 の記憶手段は、電源オフ時には記憶が消去されるメモリであることを特徴とする請求項 3 に記載のデータ受信処理装置。

【請求項 5】 データの処理に関するプログラムであって、拡張機能プログラムへの分岐を有する基本プログラムを予め記憶し、

前記データが伝送されてきたときこれを受信し、

受信された前記データを、予め記憶されている前記基本プログラムにしたがって処理し、

前記拡張機能プログラムが伝送されてきたとき、これを受信、記憶し、

前記拡張機能プログラムが記憶されているとき、前記分岐から前記拡張機能プログラムを読み出し、前記拡張機能プログラムにしたがって前記データを処理することを特徴とするデータ受信処理方法。

【請求項 6】 送信側から画像信号を符号化し、画像データとして放送し、受信側においてこの画像データを受信して復号化し、表示する放送方法において、前記画像データの復号処理に関するプログラムであって、拡張機能プログラムへの分岐を有する基本プログラムを前記受信側に予め記憶し、

前記画像データが放送されてきたとき、前記受信側でこれを受信し、

前記受信側において、受信された前記画像データを、予め記憶されている前記基本プログラムにしたがって復号処理し、

前記受信側に特定の復号処理を行わせるとき、前記送信側から前記拡張機能プログラムを放送して前記受信側に受信、記憶させ、

前記受信側において、前記拡張機能プログラムを記憶したとき、前記分岐から前記拡張機能プログラムを読み出し、前記拡張機能プログラムにしたがって前記画像データを復号処理することを特徴とする放送方法。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、データ受信処理装置およびデータ受信処理方法並びに放送方法に関し、特に例えば放送衛星や通信衛星を介してデジタル化された画像データを伝送し、これを受信する場合に用いて好適なデータ受信処理装置およびデータ受信処理方法並びに放送方法に関する。

【0002】

【従来の技術】最近、音声信号や画像信号をデジタル化し、衛星を介して放送する放送システムが普及しつつある。伝送する信号をデジタル化することにより、映像信号や音声信号のみならず、データの伝送も可能となる。

【0003】この放送は、専用のデータ受信処理装置（デコーダ）で受信することができる。また、各デコーダに、固有の番号（デコーダ ID）を割り当てておき、このデコーダ ID を識別することにより、特定のデコーダを有するものに対してのみ、さらに所定のサービスを提供する（例えば特定の有料番組を受信できるようにする）ことが可能である。すなわち、コンディショナルアクセス機能が実現可能となる。

【0004】現在、この分野においては、どのようなサービスが提供できるのかについての模索が続いており、今後、新しい形態のサービスが始まる可能性が高い。このため、デコーダは、新しいサービスが始まった場合、その新しいサービスも受けることができるように予め構成することが好ましい。新しいサービスを新しいデコーダを購入したもののみが受けられるようにすると、デコーダを購入した時期によって、利用できるサービスに差ができてしまい、不公平となるからである。

【0005】このように新しいサービス（新たな機能）を追加する場合、デコーダのプログラムに追加変更を加える必要がある。従来、このような変更を行うのに、デコーダを一旦回収して、そこに内蔵されているプログラム ROM を交換した後、デコーダを再び返却するか、デコーダごと新しいものに交換するか、あるいはデコーダに内蔵されている IC カードインタフェースを利用し、新たな IC カードを各ユーザに頒布することにより、1

Cカードから各デコーダに新たなプログラムをロードすることが検討されていた。

【0006】

【発明が解決しようとする課題】しかしながら、既に販売されたデコーダの台数が多い場合においては、これを回収するのは現実的には困難である。また、ICカードを頒布する方法は、費用がかかるばかりでなく、ICカードのメモリ容量は通常極めて小さいため、変更可能なプログラムも短いものに限られるといった課題があった。

【0007】本発明はこのような状況に鑑みてなされたものであり、安価に、かつ比較的長いプログラムでも簡単に、変更追加することができるようにするものである。

【0008】

【課題を解決するための手段】請求項1に記載のデータ受信処理装置は、伝送されたプログラムまたはデータを受信する受信手段と、受信手段により受信されたデータを処理する処理手段と、処理手段によるデータの処理に関するプログラムであって、拡張機能プログラムへの分岐を有する基本プログラムを記憶する第1の記憶手段と、受信手段により拡張機能プログラムが受信されたとき、これを記憶する第2の記憶手段とを備え、処理手段は、受信手段により受信されたデータを、第1の記憶手段に記憶されている基本プログラムにしたがって処理するとともに、第2の記憶手段に拡張機能プログラムが記憶されたとき、分岐から拡張機能プログラムを読み出し、拡張機能プログラムにしたがってデータを処理することを特徴とする。

【0009】拡張機能プログラムは圧縮して第2の記憶手段に記憶させることができる。第2の記憶手段に記憶されている、圧縮された拡張機能プログラムが展開されたとき、展開された拡張機能プログラムを記憶する第3の記憶手段をさらに設けることができる。

【0010】第1の記憶手段は、読み出し専用のメモリとし、第2の記憶手段は、電源オフ時にも記憶を保持可能なメモリとし、第3の記憶手段は、電源オフ時には記憶が消去されるメモリとすることができる。

【0011】請求項5に記載のデータ受信処理方法は、データの処理に関するプログラムであって、拡張機能プログラムへの分岐を有する基本プログラムを予め記憶し、データが伝送されてきたときこれを受信し、受信されたデータを、予め記憶されている基本プログラムにしたがって処理し、拡張機能プログラムが伝送されてきたとき、これを受信、記憶し、拡張機能プログラムが記憶されているとき、分岐から拡張機能プログラムを読み出し、拡張機能プログラムにしたがってデータを処理することを特徴とする。

【0012】請求項6に記載の放送方法は、送信側から画像信号を符号化し、画像データとして放送し、受信側

においてこの画像データを受信して復号化し、表示する放送方法において、画像データの復号処理に関するプログラムであって、拡張機能プログラムへの分岐を有する基本プログラムを受信側に予め記憶し、画像データが放送されてきたとき、受信側でこれを受信し、受信側において、受信された画像データを、予め記憶されている基本プログラムにしたがって復号処理し、受信側に特定の復号処理を行わせるとき、送信側から拡張機能プログラムを放送して受信側に受信、記憶させ、受信側において、拡張機能プログラムを記憶したとき、分岐から拡張機能プログラムを読み出し、拡張機能プログラムにしたがって画像データを復号処理することを特徴とする。

【0013】

【作用】請求項1に記載のデータ受信処理装置および請求項5に記載のデータ受信処理方法並びに請求項6に記載の放送方法においては、拡張機能プログラムが必要になったとき、その拡張機能プログラムが伝送され、記憶される。基本プログラムには予め拡張機能プログラムへの分岐が用意されており、拡張機能プログラムが記憶されたとき、基本プログラムの分岐から拡張機能プログラムを読み出すことができ、データをその拡張機能プログラムに従って処理することができる。従って、新たな拡張機能プログラムを適宜伝送し、追加することが可能になる。

【0014】

【実施例】図1は、本発明のデータ受信処理装置を応用したデジタルテレビ放送用デコーダの構成例を表している。アンテナ1は、図示せぬ衛星からの電波を受信し、電気信号としてコンバータ2に出力する。コンバータ2は、アンテナ1で受信した信号を所定の周波数の信号へダウンコンバートし、フロントエンド3に出力する。

【0015】フロントエンド3は、コンバータ2からの信号を復調し、更にエラー訂正を行った後、トランスポートブロック4に出力する。トランスポートブロック4は、フロントエンド3より入力されたパケット単位のデータを、ビデオデータパケット、オーディオデータパケット、その他のデータパケット（例えばコンディショナルアクセスデータ（後述する拡張機能プログラムもこのコンディショナルアクセスデータに含まれる）のパケット）に振り分ける。

【0016】コンディショナルアクセスデータは、ICカードインタフェース5を介してICカード5Aに送られ、このデコーダが入力信号に対してアクセス権を有するか否かの判定が行われる。アクセス権を有するとの判定がなされた場合においては、暗号解読のためのキー（コントロールワード）をトランスポートブロック4に出力する。トランスポートブロック4は、このコントロールワードを用いて、暗号解読処理を実行する。

【0017】トランスポートブロック4で分離されたビデオパケットのデータは、ビデオデコーダ10に供給さ

れ、オーディオパケットのデータは、オーディオデコーダ11に供給される。ビデオデコーダ10は、入力されたビデオデータをデコードし、NTSCエンコーダ12に出力する。NTSCエンコーダ12は、入力されたビデオデータをNTSC方式のビデオ信号にエンコードした後、出力する。

【0018】また、オーディオデコーダ11は、入力されたオーディオデータをデコードし、オーディオ信号として出力する。

【0019】CPU6は、ROM7に記憶されているプログラムに従って、各種の処理を実行する。そして、処理に必要なデータなどを適宜RAM8に記憶させる。不揮発性で書き換え可能なメモリとしてのEEPROM9には、このデコーダの電源をオフした後も保持する必要のあるデータ（例えばパスワードや、電源をオフする直前に見ていたチャンネル番号）などが記憶されるようになされている。

【0020】EEPROM9は、電源オフ後も保持しておく必要のあるデータなどを適宜記憶するものとして用いられる場合、その容量は、せいぜい数百バイトでよい。しかしながら、この実施例においては、このEEPROM9に拡張機能プログラムが書き込まれる。このため、この実施例においては、EEPROM9の容量は、例えば32キロバイトとされる。

【0021】次に、その動作について説明する。デコーダの電源がオンされたとき、CPU6は、ROM7に記憶されているプログラムに従って、各ブロックを制御し、受信動作を開始させる。これにより、フロントエンド3がアンテナ1で受信した信号をコンバータ2を介して受け取り、復調する。復調信号は、エラー訂正が施された後、トランスポートブロック4に供給される。トランスポートブロック4は入力されたパケットデータを、パケットIDから分離し、ビデオデータをビデオデコーダ10に供給し、オーディオデータをオーディオデコーダ11に供給する。

【0022】ビデオデコーダ10は、入力されたビデオデータをデコードし、NTSCエンコーダ12に出力する。NTSCエンコーダ12は、入力されたビデオデータを、NTSC方式のビデオ信号に変換して、出力する。また、オーディオデコーダ11は、入力されたオーディオデータをデコードし、オーディオ信号として出力する。

【0023】このようにして、衛星を介して放送された画像データと音声データに対応する画像と音声を図示せぬモニタ装置で視聴することができる。

【0024】トランスポートブロック4は、コンディショナルアクセスデータが入力された場合においては、これをICカードインタフェース5を介してICカード5Aに供給する。ICカード5Aに内蔵されているCPUは、トランスポートブロック4を介してCPU6に、こ

のデコーダに割り当てられているデコーダIDの読み出しを要求する。CPU6は、この要求を受けたとき、ROM7（またはEEPROM9）に記憶されているデコーダIDを読み出し、トランスポートブロック4を介してICカード5Aに供給する。

【0025】ICカード5AのCPUは、このデコーダIDがコンディショナルアクセスデータに対してアクセス権を有するデコーダIDであるか否かを判定し、アクセス権を有するデコーダIDであると判定した場合には、コントロールワードをトランスポートブロック4に供給する。トランスポートブロック4においては、このコントロールワードを用いて、コンディショナルアクセスデータの暗号解読処理を実行する。

【0026】このコンディショナルアクセスデータには、拡張機能プログラムも含まれる。

【0027】すなわち、拡張機能プログラムも暗号化され、所定のデコーダIDを含んだ複数のパケットとして、衛星を介して伝送されてくる。このため、特定のデコーダIDを有するデコーダIDだけが、これらのパケットに対するアクセス権を有し、その暗号解読を行うことができる。これにより、例えば所定の付加料金を支払ったユーザだけが、所定の拡張機能を付加することが可能となる。

【0028】CPU6は、トランスポートブロック4で解読された拡張機能ブロックをEEPROM9に転送し、記憶させる。

【0029】図2は、ROM7に記憶されている基本プログラムと、EEPROM9に記憶された拡張機能プログラムを模式的に表している。

【0030】すなわち、ROM7に記憶されている基本プログラムには、例えばそのアドレスa1に、拡張機能プログラムへの分岐のステップが含まれている。この分岐ステップには、例えば、EEPROM9のエントリt1乃至t3に記憶されているアドレスを読み取り、そのアドレスが0である場合においては、拡張機能プログラムが記憶されていないものとして、エラー処理を実行し、所定のアドレスが書き込まれている場合においては、EEPROM9のそのアドレスにアクセスし、そのアドレスに記憶されている拡張機能プログラムを読み出し、セットするように記載されている。

【0031】図2の実施例においては、EEPROM9のエントリt1にアドレスf1が記述され、エントリt2にアドレスf2が記述されている。そして、EEPROM9のアドレスf1には、拡張機能プログラム1が書き込まれており、アドレスf2には、拡張機能プログラム2が書き込まれている。従って、この拡張機能プログラム1または2の処理が実行される。

【0032】この実施例の場合、EEPROM9のエントリt3には、0が書き込まれている。従って、この実施例においては、3つの拡張機能のうち、2つの拡張機

能のみが利用することが可能であり、3番目の拡張機能プログラムはまだ利用することができない状態となっている。

【0033】EEPROM9は、RAM8に比べて一般的にアクセス速度が遅く、容量が小さく、高価である。このため、EEPROM9の容量をあまり大きくすると、コスト高となる。そこで、例えばEEPROM9に拡張機能プログラムを圧縮した状態で保存させ、電源オン時、あるいはプログラムをスタートするとき、EEPROM9に記憶されている圧縮された状態の拡張機能プログラムを展開(伸長)して、RAM8に書き込むようにすることができる。

【0034】図3は、この場合の実施例を表している。すなわち、衛星を介して伝送されてきた拡張機能プログラムがEEPROM9に書き込まれるのは、上述した場合と同様である。ただし、この図3の実施例においては、拡張機能プログラムは圧縮されたままの状態、EEPROM9に記憶される。これにより、EEPROM9の容量をそれほど大きくしなくとも、比較的長いプログラムをEEPROM9に保持することが可能になる。

【0035】プログラムを圧縮する方法としては、ロスレス(lossless)型データ圧縮方法、すなわち、展開(伸張)すれば、完全に元のデータに復元することが可能な圧縮方式(可逆符号化方式)が用いられる。この方法としては、例えばランレンクス(run length)符号化、ハフマン(Huffman)符号化、算術符号化、あるいはLempel-Ziv方式などを挙げることができる。これらの方式については、例えば「日経エレクトロニクス」1993. 5. 10(No. 580)の第94頁乃至第117頁に開示されている。

【0036】そして、この実施例の場合、ROM7のアドレスa0に、エンコーダの電源立ち上げ時、EEPROM9に記憶されている圧縮された拡張機能プログラムを展開する処理を実行することが記述されている。これにより、EEPROM9に記憶されている拡張機能テーブルがRAM8に展開して記憶される。図3の実施例の場合、RAM8のエントリT1乃至T3には、EEPROM9のエントリt1乃至t3における記述f1、f2、0に対応して、それぞれアドレスF1、F2、0が記述されている。そして、RAM8のアドレスF1には、展開された状態の拡張機能プログラム1が記憶され、アドレスF2には、展開された状態の拡張機能プログラム2が記憶される。

【0037】そして、ROM7のアドレスa1の拡張機能プログラムへの分岐ステップには、RAM8のエントリT1乃至T3が記述されている。従って、図2の実施例における場合と同様に、エントリT1に書き込まれているRAM8のアドレスF1に記憶されている拡張機能プログラム1や、エントリT2に書き込まれているアド

レスF2に記憶されている拡張機能プログラム2などが実行可能となる。

【0038】RAM8に展開されたこれらの拡張機能プログラムは、EEPROM9における場合とは異なり、デコーダの電源をオフしたとき、消去されてしまう。このため、この展開する処理は、電源をオンする度に必要となる。ただし、一旦展開した場合においては、その後、電源をオフするまで利用することが可能である。

【0039】ただし、RAM8の記憶領域が不足することが予想される場合においては、この拡張機能プログラムは、不要になったとき、ユーザからの指令に対応して消去してしまうようにすることもできる。

【0040】以上のようにして、例えば特定のデコーダに対してのみ、ゲームソフトを利用させたり、多くの放送チャンネルの中から、所望の放送チャンネルを選択するための電子番組ガイド(EPG: Electrically Program Guide)を利用可能にしたり、ペーパービュー(pay per view)の画像をモニタ可能にしたりすることが可能となる。

【0041】あるいはまた、ビデオデータとオーディオデータのうち、ビデオデータのみをスクランブル(暗号化)して放送するようにしていたものを、その後、オーディオデータもスクランブルするように、放送方法を変更したような場合において、このスクランブルされたオーディオデータをデスクランブルするためのプログラムを放送局(送信側)から各エンコーダ(受信側)に伝送し、オーディオデータもデスクランブルすることができるようにすることができる。

【0042】なお、上記実施例においては、電源オフ時においても、保持するためのメモリとしてEEPROMを用いるようにしたが、この他にも、不揮発性で書き換え可能なメモリであれば、その他のメモリを用いることも可能である。また、圧縮されたプログラムを展開(伸長)するタイミングは、それを使用するときとすることもできる。

【0043】

【発明の効果】請求項1に記載のデータ受信処理装置および請求項5に記載のデータ受信処理方法並びに請求項6に記載の放送方法においては、拡張機能プログラムが必要になったとき、その拡張機能プログラムが伝送され、記憶される。基本プログラムには予め拡張機能プログラムへの分岐が用意されており、拡張機能プログラムが記憶されたとき、基本プログラムの分岐から拡張機能プログラムを読み出すことができ、データをその拡張機能プログラムに従って処理することができる。従って、新たな拡張機能プログラムを適宜伝送し、追加することが可能になる。

【図面の簡単な説明】

【図1】本発明のデータ受信処理装置を応用したデジタルテレビ放送用デコーダの構成例を示すブロック図であ

る。

【図2】図1のROM7とEEPROM9に記憶されるプログラムを説明する図である。

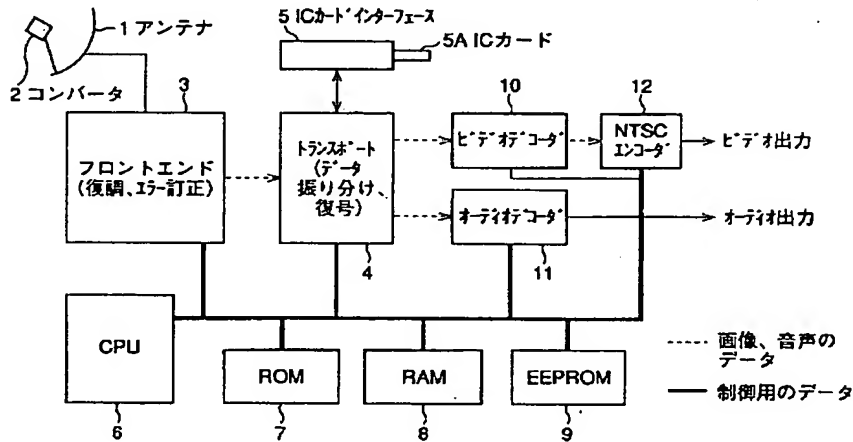
【図3】図1に示すROM7、RAM8、およびEEPROM9に記憶されるプログラムを説明する図である。

【符号の説明】

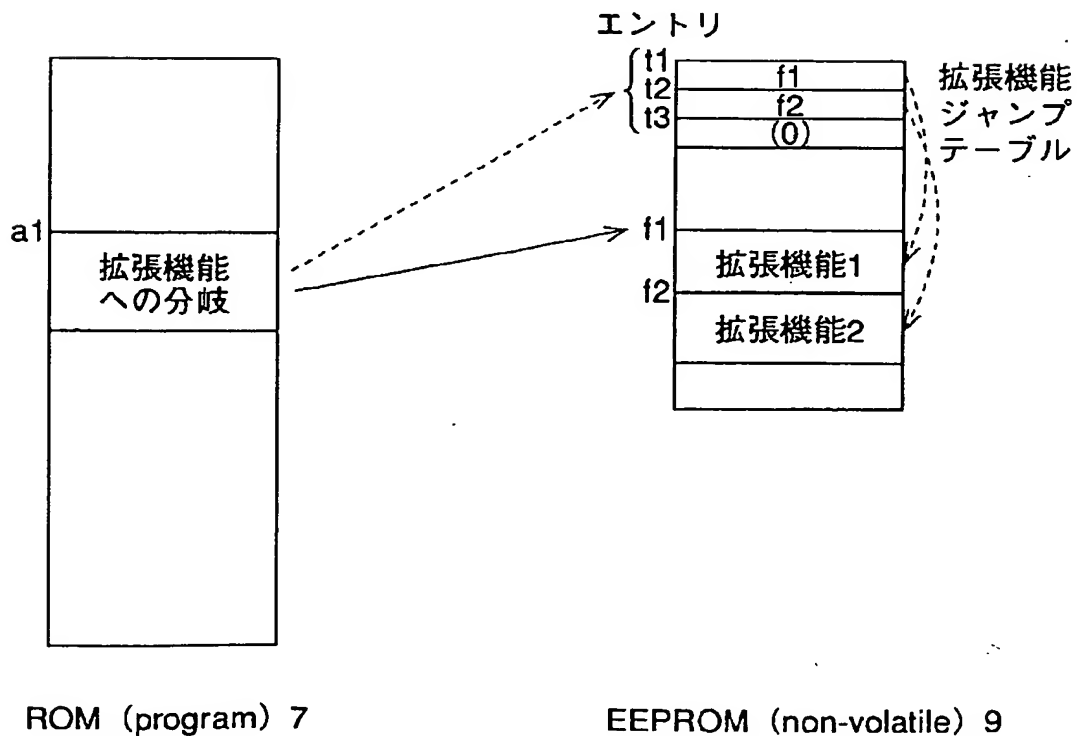
- 1 アンテナ
- 2 コンバータ
- 3 フロントエンド
- 4 トランスポートブロック

- 5 ICカードインターフェース
- 5A ICカード
- 6 CPU
- 7 ROM
- 8 RAM
- 9 EEPROM
- 10 ビデオデコーダ
- 11 オーディオデコーダ
- 12 NTSCエンコーダ

【図1】



【図2】



【図3】

